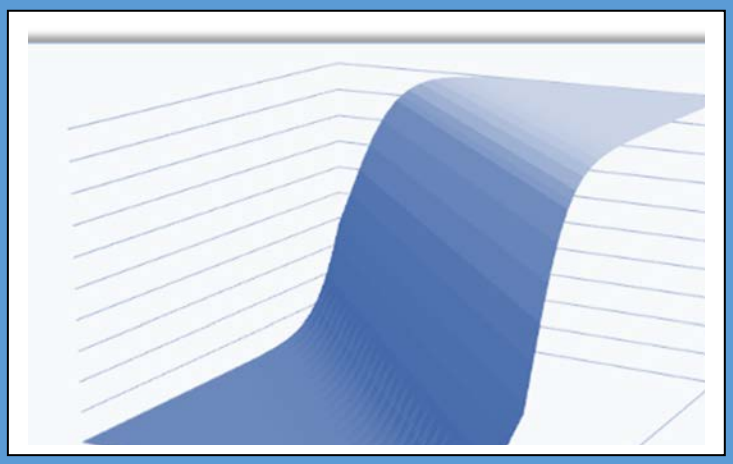

Field Trial of the Risk and Needs Triage (RANT®): Missouri Adult Treatment Court Participants

The Risk and Needs Triage (RANT®) is a screening tool designed to match the prognostic-risk and criminogenic needs of defendants with substance use disorders with dispositional outcomes that support recovery and promote law-abiding behavior (Marlowe, D. et al, 2011). To evaluate the extent to which the RANT® system is fulfilling its intended purpose with Missouri treatment court participants, a state-level field validation study was completed. Three questions guided the study: Are participants being assigned to dispositions recommended by the RANT® results? Do the RANT® results accurately predict the likelihood of re-offending? And, are these predictions neutral with regard to race and gender?

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Research & Court Programs Sections
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Prepared for Missouri's Drug Courts Coordinating Commission
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TABLE OF CONTENTS

Acknowledgments

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Executive Summary

Purpose

The Risk and Needs Triage (RANT®) is a screening tool designed to match the prognostic-risk and criminogenic needs of defendants with substance use disorders with dispositional outcomes that support recovery and promote law-abiding behavior (Marlowe, D. et al, 2011). To evaluate the extent to which the RANT® system is fulfilling its intended purpose with Missouri treatment court participants, a state-level field validation study was completed. Three questions guided the study: Are participants being assigned to dispositions recommended by the RANT® results? Do the RANT® results accurately predict the likelihood of re-offending? And, are these predictions neutral with regard to race and gender?

Background

Research has consistently shown that certain attributes and exposures such as the age of substance use onset, recurring criminal activity, and previously unsuccessful treatment outcomes are highly correlated with the likelihood of reoffending. In general, these *"prognostic-risk"* factors are immutable and require close behavioral monitoring, usually performed by probation or parole officers. In contrast, *"criminogenic needs"* represent psychosocial dysfunctions such as substance use, mental illness, chronic medical conditions, homelessness and unemployment that, when effectively addressed, substantially reduce the likelihood of future criminal misconduct (Marlowe, D.B. 2009).

Outcomes for defendants with substance use disorders improve when the services they receive are appropriately matched with their prognostic-risk and criminogenic needs. For instance, treatment courts that reserve the most intensive programming for defendants at the highest risk for reoffending, and with the greatest criminogenic need, have been shown to reduce crime approximately twice as much as those providing similar services to lower risk defendants with less serious needs (Cissner, A, et al, 2013).

The Risk and Needs Triage (RANT®) is a substance use screening tool designed to match the risk and needs of defendants with substance use disorders and dispositional outcomes that support recovery and promote law-abiding behavior (Marlowe, D. et al, 2011). The RANT® itself consists of nineteen items, fourteen of which represent a risk metric; the remaining five comprising a needs metric.

Based on a trademarked scoring algorithm which combines some of the nineteen items to yield ten binary risk and five needs items, RANT® screened defendants are classified as: High Risk/High Need (HH); Low Risk/High Need (LH); High Risk/Low Need (HL); and Low Risk/Low Need (LL). Accordingly, defendants from each classification are assigned to one of four dispositional levels (or, quadrants) containing recommended supervision and treatment modalities (Figure 1). For defendants scoring HH on the RANT®, Level 1 recommends a set of supervision and treatment techniques rooted in the ten key components that characterize a pro forma treatment court process. For defendants scoring LH, Level 2 emphasizes treatment, whereas Level 3 emphasizes accountability for HL defendants. Finally, for defendants scoring LL on their RANT®, Level 4 emphasizes diversion from, or minimal interaction with, the criminal justice system. The complete RANT® system also includes an optional thirty-two item Antisocial Personality Scale (ADP). The ADP can be used in conjunction with the base RANT® product to identify antisocial character patterns in need of additional attention.

Figure 1

Practice Models for the Risk/Need Quadrants

Quadrant 1 (High Risk/High Need): **10 Key Components** Status Calendar (bi-weekly) Moral Reconation Therapy™ Matrix Model™ or comparable curriculum Prosocial and Adaptive Habilitation 12-Step Self Help/Alumni Groups **Abstinence is distal** **Compliance is proximal** **Positive reinforcement for prosocial activities** ~18-24 mos (~200 hrs treatment, MRT, prosocial and adaptive habilitation)	**Quadrant 2 (Low Risk/High Need):** **Treatment emphasis** Noncompliance Calendar (as-needed court hearings) Matrix Model™ or comparable curriculum Adaptive Habilitation 12-Step Self Help/Alumni Groups **Abstinence is distal** **Treatment is proximal** **Positive reinforcement** ~12-18 mos (~150 hrs treatment, adaptive habilitation)
Quadrant 3 (High Risk/Low Need): **Accountability emphasis** Status Calendar (bi-weekly) Moral Reconation Therapy™ Preventative Education Life Skills Customized Self Help **Abstinence & compliance are proximal** **Negative reinforcement** ~12-18 mos (~100 hrs MRT, prosocial habilitation)	**Quadrant 4 (Low Risk/Low Need):** **Diversion emphasis** Noncompliance Calendar (as-needed court hearings) Psychoeducation Individualized/stratified groups **Abstinence is proximal** (zero tolerance for use of drugs) ~3-6 mos. (~12-26 hrs. psychoeducation)

In November 2011, as part of a nine month pilot project, Missouri's treatment court system implemented the RANT® in three of its adult treatment courts. The primary purpose of the project was to identify and resolve any procedural issues that could jeopardize scaling the screening process to state-level. Based on a process evaluation of the pilot project, the RANT® was subsequently deployed in July 2012 to all ninety-two Missouri treatment courts (89 adult & 3 veterans) via the Judicial Information System (JIS) case management system. In 2013, Missouri's Drug Courts Coordinating Committee (DCCC) requested that treatment court programs incorporate the APD into their assessment process. Since this time, Missouri treatment courts have benefited from over four years of RANT® administration experience, education, and technical support. To-date, over 7000 RANT® screenings have been performed.

Measurement tools like the RANT® should possess certain testable psychometric characteristics. Specifically, these tools should be reliable, producing stable and consistent results, and valid, accurately measuring what they purport to measure. Conducting a field trial of the RANT® in Hennepin County, MN, Marlowe, D. et al, 2011, were able to assess the reliability and validity of the RANT®. They found the RANT® produced an acceptable level of internal reliability and accurately predicted the likelihood of re-arrest and reconviction equivalently for race and gender subgroups. In June 2016, the DCCC tasked the Office of State Courts Administrator (OSCA) with conducting a methodologically comparable study to ensure these findings generalize to Missouri's treatment court population.

Study Participants

Nearly 3000 (n = 2954) pre and post disposition adult felony defendants receiving RANT® evaluations between October 1, 2013 and December 31, 2015 were selected from Missouri's forty-six JIS databases as study participants. Pre-disposition participants were referred for RANT® screenings by defense counsel or were ordered by a judicial officer as a presentencing condition. Post-disposition participants were screened as part of the standard adult drug court referral process, or as a condition of probation or release from incarceration. All RANT® screenings were completed by trained evaluators, including treatment court administrators/coordinators, counselors and probation officers. Study participants were assigned to one of the four dispositional levels identified in Figure 1 and tracked for twelve months following their RANT® evaluation date for a misdemeanor or felony re-offense resulting in a guilty plea or finding.

Key Findings

To evaluate the extent to which the RANT® system is fulfilling its intended purpose with Missouri adult drug court participants, a state-level field validation study was completed.

The major findings associated with the three questions that guided the study include:

1) Are participants being assigned to dispositions recommended by the RANT® results?

   Findings showed a high degree of congruence between the RANT® classification and the actual dispositional assignment that participants received.

   - The rate of congruence between participant's RANT® level and dispositional assignments was greater than 98%.

- When dispositional assignments did not correspond with participant's RANT® level, they were generally more intensive, often resulting in Level 1 HH assignments.
- The most common reasons participants were assigned to more intensive dispositions were a treatment court team decision (81.2%), followed by the unavailability of interventions associated with the participant's recommended RANT® classification level (18.8%). Treatment court team decision was the only reason cited for assigning participants to a less intensive disposition.
- Congruence between the RANT® classification and dispositional assignment was high, regardless of race or gender. Less than 1% of both black and white participants and less than 1% of both male and female participants received dispositions that were less intensive than those recommended by the RANT®. Assignment rates to more intensive dispositions were virtually identical by race and gender.

2) Do the RANT® results accurately predict the likelihood of re-offending?

Findings showed the RANT® factors had an acceptable level of reliability measured as internal consistency and statistically significant accuracy in predicting reoffending as evidenced through logistic regression modeling and ROC/AUC analytics.

- Reliability assessment of the ten binary RANT® risk indices was 0.59, slightly below the acceptable level; .62, slightly above acceptable level for the five binary RANT® need indices and, .70 for all nineteen RANT® variables combined, well above the acceptable level.
- Logistic regression results showed:
    - High risk participants were nearly three times more likely to recidivate than their low risk counterparts.
    - High need participants were over two times more likely to recidivate than low need participants.
    - HH participants were nearly fourteen times, and HL participants over nine times more likely to recidivate than LL participants. There was no statistically significant difference in the recidivism rate for LH participants compared with LL participants.

- Receiver operating curve (ROC) analysis (and an associated AUC statistic of .694 for all fifteen RANT® variables combined) showed the entire RANT® discriminated between recidivists and non-recidivists near the .70 level generally considered indicative of effective prediction.

3) And, are these predictions neutral with regard to race and gender?

Findings showed no evidence of racial or gender bias in the prediction of recidivism by the RANT®.

- Logistic regression analysis showed:
    - No significant interaction between race and risk (or need) level on the rate of recidivism.
    - No significant three-way interaction of race by risk by need on the rate of recidivism.
    - No significant interaction between gender and risk (or need) level on the rate of recidivism.
    - No significant three-way interaction of gender by risk by need on recidivism.

Limitation

A primary limitation of the study was that nearly 80% of participants were classified by the RANT® as HH. The lack of variance in RANT® classifications may stem from some form of defendant pre-screening by court and legal staff which resulted in more serious offenders with more significant substance use issues being directed to the RANT® screening process. Regardless, whenever a disproportionate number of cases in a sample result in similar outcomes (classification status), statistical significance in predictive measures (e.g., recidivism) is more difficult to achieve.

Practice Considerations

The overall results of the study should serve as an endorsement of the RANT® for use with Missouri's adult drug court population as the findings reinforce those of previous ones that demonstrate that RANT® classification assignments are, at once, gender and race neutral, and significantly related to the risk of recidivism.

With that knowledge, judges, administrators and legal staff alike should be assured regarding the accuracy of the RANT® and readily consider administering it earlier in the criminal case process (soon after arrest). Earlier administrations could mean that more defendants will benefit from dispositional assignments that provide an appropriate level of service to meet their particular prognostic risk and criminogenic needs. To accommodate these defendants, Missouri adult drug courts may find it necessary to develop and/or refine the various programs that comprise treatment contracts other than those associated with the complete battery offered through traditional drug court.

Field Trial of the Risk and Needs Triage (RANT®): Missouri Adult Treatment Court Participants

Purpose

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Methods

Participants

Over 4200 (n=4266) pre and post disposition adult felony defendants receiving RANT® evaluations between October 1, 2013 and December 31, 2015 were selected from Missouri's forty-six (JIS) databases as potential study participants. Pre-disposition participants were referred for RANT® screenings by defense counsel or were ordered by a judicial officer as a presentencing condition. Post-disposition participants were screened as part of the standard adult drug court referral process, or as a condition of probation or release from incarceration. All RANT® screenings were completed by trained evaluators, including treatment court administrators/coordinators, counselors and probation officers. Subsequent to their RANT® screening, potential participants were either admitted or denied admission to adult drug court. Of the 4266 potentially eligible study participants, 1312 were not admitted into drug court. Table 1 presents the distribution of reasons for non-admission by the respective RANT® classification level. The most frequently reported reasons for non-admission were prosecutorial decision to deny admission (41.1%), followed by defendants opting-out of drug court participation (27.1%), and defendant ineligibility (21.5%), often due to criminal history or the nature of the presenting offense. Table 1 further shows the most common reason for non-admission varied by defendants RANT® classification level.

Table 1

Reason for Non-Admittance	RANT® Classification Level				
	Level 1 HIGH/HIGH	Level 2 LOW/HIGH	Level 3 HIGH/LOW	Level 4 LOW/LOW	Total
PA Decision	450 (44.8%)	18 (23.4%)	46 (28.8%)	25 (32.9%)	539 (41.1%)
Defendant Opt-Out	278 (27.7%)	24 (31.2%)	35 (22.6%)	19 (25.0%)	356 (27.1%)
Not Eligible	170 (16.9%)	23 (29.9%)	60 (38.7%)	29 (38.2%)	282 (21.5%)
Judicial Override	40 (4.0%)	5 (6.5%)	8 (5.2%)	3 (3.9%)	56 (4.3%)
Dismissed	18 (1.8%)	3 (3.9%)	2 (1.3%)	0 (0.0%)	23 (1.8%)
Mental Health	19 (1.9%)	1 (1.3%)	1 (.6%)	0 (0.0%)	21 (1.6%)
Medical	10 (1.0%)	3 (3.9%)	2 (1.3%)	0 (0.0%)	15 (1.1%)
Admitted to Other Treatment Program	13 (1.3%)	0 (0.0%)	2 (2.5%)	0 (0.0%)	13 (1.0%)
Other	5 (.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (.4%)
Criminal History	1 (.2%)	1 (2.8%)	1 (.6%)	0 (0.0%)	1 (.1%)
Program At Capacity	1 (.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (.1%)
Total	**1004 (100.0%)**	**77 (100.0%)**	**155 (100.0%)**	**76 (100.0%)**	**1312 (100.0%)**

The remaining, nearly 3000 (n=2954) defendants formed the final participant pool for the study. Individuals from this group were assigned to one of the four dispositional levels identified in Figure 1 and tracked for twelve months following their RANT® evaluation date for a misdemeanor or felony re-offense resulting in a guilty plea or finding. Characteristics of selected participants are presented in Table 2. Participants were predominately male (62.6%), Caucasian (76.6%) or Black (21.6%), with an average age of 30.4, and an age range of 17 and 75. Slightly less than 2% of participants were of other racial backgrounds. Nearly 70% of all participants were charged with a drug or alcohol related offense, followed by property offenses (19.2%), including burglary, property damage, stealing and stolen property. Slightly more than 11% were charged with other miscellaneous offenses. Nearly 28% percent of participants reported being homeless at some time in the preceding twelve months, while slightly less than 66% were employed full or part-time for at least one month during the same period. The average number of prior felony convictions for participants was .97, with an average number of prior serious misdemeanor convictions of .93, and previous substance use treatment attempts of 1.68.

Table 2

Charge	Frequency	Percent
Drug	2056	69.6%
Property (burglary, property damage, stealing and stolen property)	569	19.2%
Other	329	11.2%
Gender		
Male	1850	62.6%
Female	1101	37.3%
Age		
Average	30.4	N/A
Range	17-75	N/A
Race		
Black	637	21.6%
White	2262	76.6%
Other	55	1.8%
Structural Factors		
Homelessness	824	27.9%
Employment (employed full or part-time for at least one month in the past year)	1938	65.6%
Average number of prior felony convictions	.97	N/A
Average number of prior serious misdemeanor convictions	.93	N/A
Average number of substance abuse treatment attempts	1.68	N/A

Data Analyses

Reliability Assessment

Reliability refers to the extent to which a measurement tool produces stable and consistent results. For a tool to be valid it must also demonstrate a credible level of reliability. To assess the reliability of the RANT®, Cronbach's coefficient alpha, a form of reliability, was computed. Alpha levels greater than 0.60 are generally considered acceptable.

Cronbach's alpha for the ten binary RANT® risk indices was 0.59, slightly below the acceptable level. The elimination of one item (R1 Age) with a negative item-total correlation resulted in an alpha level of 0.62 for the remaining risk scale, slightly above the acceptable level.

Cronbach's alpha for the five binary RANT® need indices was 0.62. The elimination of one item (N4 Mental Health) with an item-total correlation of 0.18 resulted in an alpha level of 0.67 for the remaining scale, somewhat above the acceptable level.

Cronbach's alpha for all nineteen RANT® variables combined was 0.70. The elimination of one item (R1 Age) with negative item-total correlation of -.054 resulted in an alpha level of 0.72 for the remaining scale, well above the acceptable level.

Classification Rates

Table 3 presents the RANT® classification rates for participants for whom twelve months had elapsed since their RANT evaluation date. The RANT® classified 79.4% of these participants as HH, 6.2% as LH, 10.0% as HL and 4.5% LL. The proportionately larger number of high risk participants may stem from some form of defendant pre-screening by court and legal staff which results in more serious offenders being directed to the RANT® screening process.

Table 3

RANT® Classifications				
Level 1 HH	**Level 2 LH**	**Level 3 HL**	**Level 4 LL**	**Total**
2344 (79.4%)	183 (6.2%)	295 (10.0%)	132 (4.5%)	2954 (100%)

Congruence Rates

Scoring a risk screening tool is not the same as *using* the tool (Miller & Maloney. 2013). Not uncommonly, users of risk screening tools report that while they score such instruments because they are required to do so, they often ignore or override the results based on their perceptions of the case. Not only does such a strategy degrade accuracy (Hanson, 2009) but fails to reflect due diligence, making staff vulnerable to criticism and potentially liable in the event of client failures.

Table 4 presents the congruence rates for RANT® classifications and actual dispositional assignments. The overall congruence rate was slightly greater than 98%. In other words, less than 2% of participants received dispositional assignments that were either more, or less, intensive than were indicated by their RANT® classifications. When dispositional assignments did not match with the corresponding RANT® classification, a more intensive assignment was generally applied; in particular, a Level 1 treatment court placement was administered. The most common reasons participants were assigned to more intensive dispositions than recommended by their RANT® classification level were 1) a treatment court team decision (81.2%), or 2) the unavailability of interventions associated with the participant's original RANT® classification level (18.8%). Treatment court team decision (100%) was cited as the only reason for assigning participants to a less intensive disposition.

Table 4

RANT® Classification	Actual Dispositional Assignment				
	Level 1 HH	Level 2 LH	Level 3 HL	Level 4 LL	Total
Level 1 HH	2343 (98.2%)	0 (0.0%)	1 (0.4%)	0 (0.0%)	2344 (100%)
Level 2 LH	17 (.5%)	164 (99.4%)	1 (0.4%)	1 (0.8%)	183 (100%)
Level 3 HL	21 (.9%)	1 (0.6%)	268 (98.9%)	5 (3.8%)	295 (100%)
Level 4 LL	5 (.2%)	0 (0.0%)	1 (0.4%)	126 (95.5%)	132 (100%)
Total	**2386 (80.7%)**	**165 (5.5%)**	**271 (9.3%)**	**132 (4.4%)**	**2954 (100%)**

Overall Predictive Validity

For the purposes of the study, recidivism was defined as any plea or finding of guilt for a new felony or misdemeanor charge that occurred within twelve months of participants initial RANT® evaluation. The definition includes traffic offenses that meet the charge level criteria. Based on this definition, Table 5 shows the twelve month post-RANT® recidivism rates were highest for HH participants (9.6%) followed by HL participants (6.4%), LH (5.5%) and LL participants (0.8%). The recidivism rate of participants overall was nearly 9%.

Table 5

RANT® Classification Level	No	Yes	Percent Recidivism
Level 1 HH	2118	226	9.6%
Level 2 LH	173	10	5.5%
Level 3 HL	276	19	6.4%
Level 4 LL	131	1	0.8%
Total	**2698**	**256**	**8.7%**

Logistic regression is a statistical modeling technique frequently used to estimate the power of one or more independent variables to predict a specific dichotomous outcome. In the present context, logistic regression was used to estimate the power of RANT® factors to predict recidivism. Typically, logistic regression odds ratios *[OR]* are used to describe the strength of this relationship, where effectiveness is demonstrated when the ratio is statistically greater than 1 (no power). The results of a logistic regression analysis performed on the RANT® are presented in Table 6. The results show that high risk participants re-offend significantly more often than low risk participants, $X^2 = 11.926(1)$, $p = .001$. In fact, high risk participants were nearly three times more likely to reoffend than their low risk counterparts (**odds ratio** *[OR] = 2.828, p = .001)*. A significant main effect for needs level, indicating high need participants were two times more likely to reoffend than low need participants was also observed, $X^2 = 10.001(1)$, $p = .002$; $[OR] = 2.096$, $p = .002$.

Table 6

Logistic Regression Main Effects * Recidivism								
							95% C.I.for EXP(B)	
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Risk (H vs L)	1.04	.314	10.952	1	.001	2.828	1.528	5.235
Need (H vs L)	.740	.239	173.069	1	.002	2.096	1.312	3.349

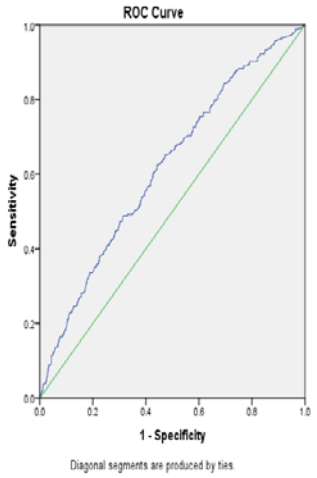
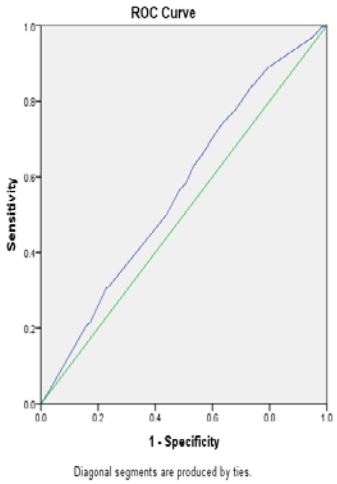
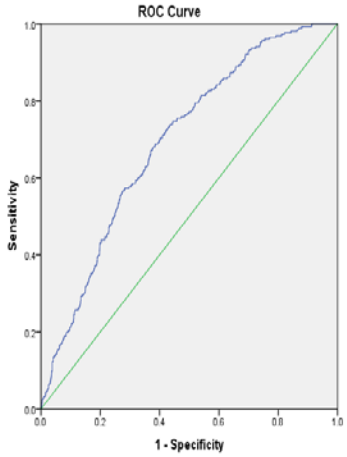
Specific cell contrasts, presented in Table 7, further show that HH participants recidivated significantly more often than LL participants (*[OR] = 13.789, p = .009),* as did HL participants (*[OR] = 9.018, p = .033).* There was no statistically significant difference in the recidivism rate for LH participants when compared with LL participants *([OR] = 7.572, p = 0.055).*

Table 7

Logistic Regression Specific Contrasts * Recidivism								
							95% C.I.for EXP(B)	
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Risk/Need Score (HH)	2.638	1.006	6.870	1	0.009	13.789	1.945	100.455
Risk/Need Score (LH)	2.024	1.055	3.861	1	0.055	7.572	0.957	58.896
Risk/Need Score (HL)	2.199	1.031	4.546	1	0.033	9.018	1.194	68.091
Risk/Need Score (LL)*			12.741	3	0.005			

*Reference group

A limitation of logistic regression is that it models the sensitivity (the ability of the RANT® to correctly identify recidivists) and specificity (the ability of the RANT® to correctly identify non-recidivists) of a binary classifier using a single cutoff point. A Receiver Operating Curve (ROC) is a graphical plot of the sensitivity and specificity that includes **all possible cutoff points**. The Area Under the Curve (AUC) statistic is commonly used to summarize a ROC using a single number, ranging from .50 (predictive power no better than chance) to 1 (perfect predictive power). Typically, AUC values near or above .70 indicate effective prediction. Figure 2 graphically depicts the ROC for the ten binary RANT® risk items and their associated AUC value of .62. A similar analysis completed using the five RANT® needs items produced the ROC presented in Figure 3. The associated AUC for that curve was .56. Neither the RANT® risk, nor needs factors AUC showed strong predictive power. However, the ROC for all fifteen RANT® variables combined is presented in Figure 4. The AUC (.694) associated with this curve shows the entire RANT® assessment was considerably more effective at identifying recidivists and non-recidivists than either the risk or needs scales considered independently.

Figure 2	Figure 3	Figure 4
		

Predictive Validity by Race and Gender

Of the 2954 participants, 2262 (76.6%) self-identified as white, while 637 (21.6%) self-identified as black. Fewer than 2% of participants identified as another race. As such, the results of the analyses that follow focus exclusively on white and black participants.

Table 8 shows the RANT® classified proportionately more white (82.5%) than black (68.6%) participants as HH, but proportionately more black (17.1%) than white (7.9%) participants HL. However, combining the **high risk cells** (HH and HL), the RANT® classified a greater proportion of white (90.4%) participants as high risk than their black (85.7%) counterparts. A chi-square analysis of the two high risk RANT® cells combined showed this relationship to be statistically significant $X^2 = 11.52(1), p = .001.$ Using the same level of analysis for the two high needs cells combined, white participants were also significantly more often classified as high need $X^2 = 91.08(1), p = .000.$

Table 8

RANT® Classification	Black	White
Level 1 HH	437 (68.6%)	1867 (82.5%)
Level 2 LH	34 (5.3%)	145 (6.4%)
Level 3 HL	109 (17.1%)	178 (7.9%)
Level 4 LL	57 (8.9%)	72 (3.2)%
Total	**637 (100%)**	**2262 (100%)**

Table 9 shows the congruence between actual participant dispositional assignment and their recommended RANT® classification was quite high, regardless of race. No black participant and only .40% of white participants received dispositions that were less intensive than those recommended by the RANT®. And, assignment rates to more intensive dispositions for white participants (1.6%) were virtually identical to their black counterparts (1.3%). Statistical tests of significance for congruence rates were precluded because an insufficient number of overrides were available for this level of analysis. The majority of overrides resulted in Level 1 HH assignments.

Table 9

Actual Assignment Level								
	Black				White			
RANT® Classification	Level 1 HH	Level 2 LH	Level 3 HL	Level 4 LL	Level 1 HH	Level 2 LH	Level 3 HL	Level 4 LL
Level 1 HH	437 (100%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1866 (99.9%)	0 (0.0%)	0 (0.0%)	4 (0.0%)
Level 2 LH	3 (8.8%)	31 (91.2%)	0 (0.0%)	0 (0.0%)	14 (9.7%)	129 (89.0%)	1 (0.7%)	0 (0.0%)
Level 3 HL	4 (3.7%)	0 (0.0%)	105 (96.3%)	0 (0.0%)	16 (9.0%)	1 (0.6%)	157 (88.2%)	4 (2.2%)
Level 4 LL	1 (1.8%)	0 (0.0%)	0 (0.0%)	56 (98.2%)	4 (5.6%)	0 (0.0%)	1 (1.4%)	67 (93.1%)
Total	**445**	**31**	**105**	**56**	**1900**	**130**	**160**	**72**

A chi-square analysis showed a statistically significant association between race and recidivism, with a higher rate of recidivism for black (10.7%) participants than that identified for white (8.0%) participants $X^2 = 4.524(1), p = .003$.

However, logistic regression analyses presented in Table 10 revealed no significant interaction between race and risk level on the rate of recidivism *([OR] = 2.883*, *p = 0.189*). Similarly, Table 11 shows there was no significant interaction between race and need level *([OR = 1.438, p = 0.469*). Finally, Table 12 shows there was no significant three-way interaction of race by risk by need on recidivism *([OR] = 1.298, p = 0.561).* Together, the results showed no evidence of racial bias in the prediction of recidivism by the RANT®.

Table 10

Logistic Regression * Race * Risk * Recidivism								
							95% C.I.for EXP(B)	
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Race	-0.655	.792	.684	1	0.408	.519	.110	2.452
Risk	0.753	.350	4.631	1	0.031	2.122	1.069	4.121
Race X Risk	1.059	.817	1.723	1	.189	2.883	.593	14.012

Table 11

Logistic Regression * Race * Need * Recidivism								
							95% C.I.for EXP(B)	
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Race	0.095	0.476	0.040	1	0.841	1.100	0.433	2.796
Need	0.696	0.319	4.768	1	0.029	2.005	1.074	3.744
Race X Need	0.363	0.502	0.523	1	0.469	1.438	.538	3.846

Table 12

Logistic Regression * Race * Risk * Need * Recidivism								
							95% C.I.for EXP(B)	
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Race	0.201	0.418	0.231	1	0.631	1.222	0.539	2.772
Risk	.805	0.330	5.939	1	0.015	2.236	1.171	4.270
Need	0.592	0.418	3.821	1	0.051	1.754	0.998	3.270
Race X Risk X Need	.260	0.448	0.339	1	0.561	1.298	0.540	3.119

Of the 2954 participants, 1850 (62.6%) self-identified as male, while 1101 (37.3%) self-identified as female. Table 13 shows the RANT® classified proportionately more female (81.7%) than male (77.9%) participants as HH, but proportionately more male (12.1%) than female (6.5%) participants as HL. Combining the **high risk cells** (HH and HL), the RANT® classified a greater proportion of male (90.0%) participants as high risk compared with their female (88.2%) counterparts. A chi-square analysis showed this relationship not to be statistically significant; male and female participants were equally likely to be classified as high risk $X^2 = 2.365(1), p = .124.$ However, using the same level of analysis for the two high needs cells combined, female participants were significantly more likely to be classified as high need compared with male participants $X^2 = 17.182(1), p = .000.$

Table 13

RANT® Classification	Female	Male
Level 1 HH	899 (81.7%)	1442 (77.9%)
Level 2 LH	81 (7.4%)	102 (5.5%)
Level 3 HL	72 (6.5%)	223 (12.1%)
Level 4 LL	49 (4.5%)	83 (4.5%)
Total	**1101**	**1850**

Table 14 shows the congruence between actual participant dispositional assignment and their RANT® classification was quite high, regardless of gender. Less than 1% of both female (.09%) and male (.37%) participants received dispositions that were less intensive than those indicated by the RANT®. Assignment rates to more intensive dispositions were virtually equal for female (1.7%) and male (1.4%) participants. Statistical tests of significance of congruence rates were precluded by an insufficient number of overrides for this level of analysis. However, the majority of overrides resulted in Level 1 HH assignments.

Table 14

Actual Assignment Level								
	Female				Male			
RANT® Classification	**Level 1 HH**	**Level 2 LH**	**Level 3 HL**	**Level 4 LL**	**Level 1 HH**	**Level 2 LH**	**Level 3 HL**	**Level 4 LL**
Level 1 HH	899 (100%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1441 (99.9%)	0 (0.0%)	1 (0.1%)	0 (0.0%)
Level 2 LH	10 (12.3%)	71 (87.7%)	0 (0.0%)	0 (0.0%)	7 (6.9%)	93 (91.2%)	1 (1.0%)	1 (1.0%)
Level 3 HL	5 (6.9%)	0 (0.0%)	66 (91.7%)	1 (0.0%)	16 (7.2%)	1 (0.4%)	202 (89.4%)	4 (1.8%)
Level 4 LL	3 (6.1%)	0 (0.0%)	1 (2.0%)	45 (91.8%)	2 (2.4%)	0 (0.0%)	0 (0.0%)	81 (97.6%)
Total	**917**	**71**	**67**	**46**	**1466**	**94**	**204**	**86**

A chi-square analysis showed a statistically significant association between gender and recidivism, with a higher rate of recidivism for male (9.6%) participants than female (7.1%) $X^2 = 5.608(1), p = .018.$

However, logistic regression analyses presented in Table 15 revealed no significant interaction between gender and risk level on the rate of recidivism *([OR]= 1.12, p = 0.862*). Similarly, Table 16 shows there was no significant interaction between gender and need level observed *([OR] = 1.226, p = 0.710*). Finally, Table 17 shows there was no significant three-way interaction of gender by risk by need on recidivism *([OR] = 1.226, p = 0.813*). Together, the results show no evidence of gender bias in the prediction of recidivism by the RANT®.

Table 15

Logistic Regression * Gender * Risk * Recidivism								
							95% C.I.for EXP(B)	
	B	**S.E.**	**Wald**	**df**	**Sig.**	**Exp(B)**	**Lower**	**Upper**
Gender	0.214	0.638	0.113	1	0.737	1.239	0.355	4.321
Risk	0.955	0.522	3.346	1	0.067	2.599	0.934	7.230
Gender X Risk	0.113	0.654	0.030	1	0.862	1.120	0.311	4.035

Table 16

Logistic Regression * Gender * Need * Recidivism								
							95% C.I.for EXP(B)	
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Gender	.179	0.528	.115	1	0.735	1.196	.425	3.366
Need	.624	0.473	1.745	1	0.186	1.867	0.739	4.716
Gender X Need	.204	0.548	0.139	1	0.710	1.226	0.419	3.590

Table 17

Logistic Regression * Gender * Risk * Need * Recidivism								
							95% C.I.for EXP(B)	
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Gender	0.540	0.426	1.610	1	0.205	1.716	0.745	3.954
Risk	0.959	0.385	6.194	1	0.013	2.609	1.226	5.552
Need	0.774	0.404	3.676	1	0.055	2.168	0.983	4.783
Gender X Risk X Need	-0.207	0.442	0.218	1	0.641	0.813	0.342	1.936

Dispositional Assignment

As Table 4 illustrates, virtually all Level 1 HH (98.2%) participants were assigned as intended to treatment court. Congruence rates for participants from other levels were similarly high, with 99.4% of Level 2 LH receiving treatment focused assignments as intended and 98.9% of Level 3 HL participants receiving the intended accountability focused assignments. Level 4 LL participants were only slightly less likely (95.5%) than other level participants to receive the diversion focused assignments intended for that group. In those instances when participants were not assigned to their intended assignments, they most often received a more intensive assignment, particularly the full array of treatment court interventions.

Very few participants (<1.5%) received dispositional assignments that were either less or more intensive dispositional assignments. Thus, any statistical analysis of the relationship between the rate of recidivism for these participants and those receiving their RANT® indicated disposition would not be considered meaningful.

Key Findings

To evaluate the extent to which the RANT® system is fulfilling its intended purpose with Missouri adult drug court participants, a state-level field validation study was completed.

The major findings associated with the three questions that guided the study include:

1) Are participants being assigned to dispositions recommended by the RANT® results?

   Findings showed a high degree of congruence between the RANT® classification and the actual dispositional assignment that participants received.

   - The rate of congruence between participant's RANT® level and dispositional assignment was greater than 98%.
   - When dispositional assignments did not correspond with participant's RANT® level, assignments were generally more intensive, often resulting in Level 1 HH assignments.
   - The most common reasons participants were assigned to more intensive dispositions were a treatment court team decision (81.2%), followed by the unavailability of interventions associated with the participant's recommended RANT® classification level (18.8%). Treatment court team decision was the only reason cited for assigning participants to a less intensive disposition.
   - Congruence between the RANT® classification and dispositional assignment was high, regardless of race. Less than 1% of both black and white participants received dispositions that were less intensive than those recommended by the RANT®. Assignment rates to more intensive dispositions for white participants were virtually identical to their black counterparts.
   - Congruence between the RANT® classification and dispositional assignment was also high, regardless of gender. Less than 1% of both female and male participants received dispositions that were less intensive than those indicated by the RANT®. Assignment rates to more intensive dispositions were virtually equal for male and female participants.

2) Do the RANT® results accurately predict the likelihood of re-offending?

Findings showed the RANT® factors had an acceptable level of reliability measured as internal consistency and statistically significant accuracy in predicting reoffending as evidenced through logistic regression modeling and ROC/AUC analytics.

- Reliability assessment of the ten binary RANT® risk indices was 0.59, slightly below the acceptable level; .62, slightly above acceptable level for the five binary RANT® need indices and; .70 for all nineteen RANT® variables combined, well above the acceptable level.
- Logistic regression results showed:
    - High risk participants were nearly three times more likely to recidivate than their low risk counterparts, *[OR] = 2.828, p = .001*.
    - High need participants were over two times more likely to recidivate than low need participants, *[OR] = 2.096, p = .002*.
    - HH participants were nearly fourteen times (*[OR] = 13.789, p = .009),* and HL participants over nine times more likely to recidivate than (*[OR] = 9.018, p = .033)* than LL participants*.* However, there was no statistically significant difference in the recidivism rate for LH participants compared with LL participants *([OR] = 7.572, p = 0.055).*
- Receiver operating curve (ROC) analysis and the associated AUC statistic of .694 for all fifteen RANT® variables combined showed the entire RANT® discriminated between recidivists and non-recidivists near the .70 level generally considered indicative of effective prediction.

3) And, are these predictions neutral with regard to race and gender?

Findings showed no evidence of racial or gender bias in the prediction of recidivism by the RANT®.

- Logistic regression analysis showed:
    - No significant interaction between race and risk level on the rate of recidivism *([OR] = 2.883*, *p = 0.189*)
    - No significant interaction between race and need level on the rate of recidivism *([OR = 1.438, p = 0.469*).

- No significant three-way interaction of race by risk by need on the rate of recidivism *([OR] = 1.298, p = 0.561).*
- *N*o significant interaction between gender and risk level on the rate of recidivism *([OR] = 1.12, p = 0.862*).
- No significant interaction between gender and need level observed *([OR] = 1.226, p = 0.710*).
- No significant three-way interaction of gender by risk by need on recidivism *([OR] = 1.226, p = 0.813*).

Limitation

A primary limitation of the study was that nearly 80% of participants were classified by the RANT® as HH. The lack of variance in RANT® classifications may stem from some form of defendant pre-screening by court and legal staff which resulted in more serious offenders with more significant substance use issues being directed to the RANT® screening process. Regardless, whenever a disproportionate number of cases in a sample result in similar outcomes (classification status), statistical significance in predictive measures (e.g., recidivism) is more difficult to achieve.

Practice Considerations

The overall results of the study should serve as an endorsement of the RANT® for use with Missouri's adult drug court population. The findings reinforce those of previous ones that demonstrate RANT® classification assignments are, at once, gender and race neutral, and significantly related to the risk of recidivism. With that knowledge, judges, administrators and legal staff alike should be assured regarding the accuracy of the RANT® and readily consider administering it earlier in the criminal case process (soon after arrest). Earlier administrations could mean more defendants will benefit from dispositional assignments that provide an appropriate level of service to meet their particular prognostic risks and criminogenic needs. To accommodate these defendants, Missouri adult drug courts may find it necessary to develop and/or refine the various programs contained in the dispositional matrix associated with the RANT® classifications beyond those generally ascribed to traditional drug court.

References

Cissner, A., Rempel, M., Franklin, A.W., Roman, J.K., Bieler, S., Cohen, R., & Cadoret, C.R. (2013, March). *A statewide evaluation of New York's adult drug courts: Testing which policies work best*. Paper presented at the New York Association of Drug Treatment Court Professionals Training.

Marlowe, D.B. (2009). *Evidence-based sentencing for drug offenders: An analysis of prognostic risks and criminogenic needs*. Chapman Journal of Criminal Justice, 1(1), 167–201.

Marlowe D. B., Festinger D. S., Dugosh K. L., Caron A., Podkopacz M. R., Clements N. T. (2011*). Targeting dispositions for drug-involved offenders: A field trial of the Risk and Needs Triage (RANT™).* Journal of Criminal Justice, 39, 253-260

Miller, J., & Maloney, C. (2013). Practitioner compliance with risk/needs assessment tools: *A theoretical and empirical assessment.* Criminal Justice and Behavior, *40*, 716-736.

Muthen, L. K., & Muthen, B. O. (2015). *Mplus User's Guide v7.3*. Los Angeles, CA: Author.